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Motor Monitoring System Using IOT

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ABSTRACT: The Fault is the deviation in the condition of the system or component parameter from the healthy state. Thence, the faults of the industrial system dramatically affect the reliability, productivity, product quality, also unexpected security issues. Consequently, adopting efficient fault detection and diagnosis (FDD) techniques plays a crucial role in increasing the reliability, maintainability, and safety of these systems. Currently, various research groups are developing algorithms addressing the fault detection problem. These can be classified in different categories based on their methodology; these include model-based approaches, data-driven approaches, and finally, knowledge-based approaches. The observer is an estimated system based on the dynamic model of the engineering systems to estimate their states or parameters. The accuracy in the state estimation and the adaptation in the practical implementation led to the wide spreading of observer technique in the control and fault detection for the industrial applications.Power supply networks are growing continuously and their reliability getting more important than ever. The complexity of the whole network comprises numerous components that can fail and interrupt the power supply for end user. For most of the worldwide operated low voltage and medium voltage distribution lines, some faults are as follow. The reason for this paper is to decide the separation from the base station's underground link blame in kilometers. In this task we utilized a basic idea of ohm's low .When a blame happens in the framework the separation situated on fluid gem show (LCD

.**KEYWORDS:** Temperature Sensor, Humidity Sensor, Induction Motor, Transformer

I. INTRODUCTION

Every Industry pays huge amount for their Machinery maintenance at respective period of time. If we start to monitor the functional properties and positioning of parts of the system, it will be easier to make the system efficient and it results in reduction of maintenance cost. This process of frequent monitoring also saves the machine from major defect and helps with finance management. This method is based on monitoring of industrial machines with various sensors that are suitable for particular system using IoT.Thus, the proposed system model consists of the following Arduino board consisting of the microcontroller, different sensors like vibration sensor, IR sensor and voltagesensor are used. NodeMCU WIFI module used is ESP 8266 which is used to connect the hardware that is the Arduino to the internet so that the real time data collected is sent to the cloud for storage in the cloud database. Relay is connected to NodeMCU to control the motor.Electrical machines are different from each other in every aspects.The fault detection system is designed based on their functional and physical properties. So here we use prototype with five different sensors. They are oil level, Voltage, vibration, oil wetness and temperature sensor. These sensors gather information from the system and transfers to real time system Microcontroller and then displayed in LCD and blynk app. If any fault detected buzzer alerts the person in charge and at the same time alerts the main system monitor which is main stream for maintenance. With help of this even a little defect can be overcome and prevent the machine from major fault.

II. PROPOSED SYSTEM

The induction motor is very reliable machine and the design of this motor enables the machine to work in various rough environments. It may experience various faults/abnormal conditions. The various faults include stator faults, rotor faults & bearing faults. All these faults have their own after effects. These after effects may be very hazardous to the motor if the fault is sustained for a long time. Therefore it becomes very important to clear the fault as soon as it occurs.So we need to have a system that detects the faults and isolates the motor from supply as soon as they occur. Fault Monitoring is used extensively in plants to monitor the performance of machines in order to avoid the consequences of failure before it occurs, eliminate unnecessary losses and prevent machine failures. Different parameters of the motor are sensed for the detection of faults.So we need to have a system that detects the faults and isolates the motor from supply as soon as they occur. Fault Monitoring is used extensively in plants to monitor the performance of machines in order to avoid the consequences of failure before it occurs, eliminate unnecessary losses and prevent machine failures. Different parameters of the motor are sensed for the detection of faults.

BLOCK DIAGRAM:
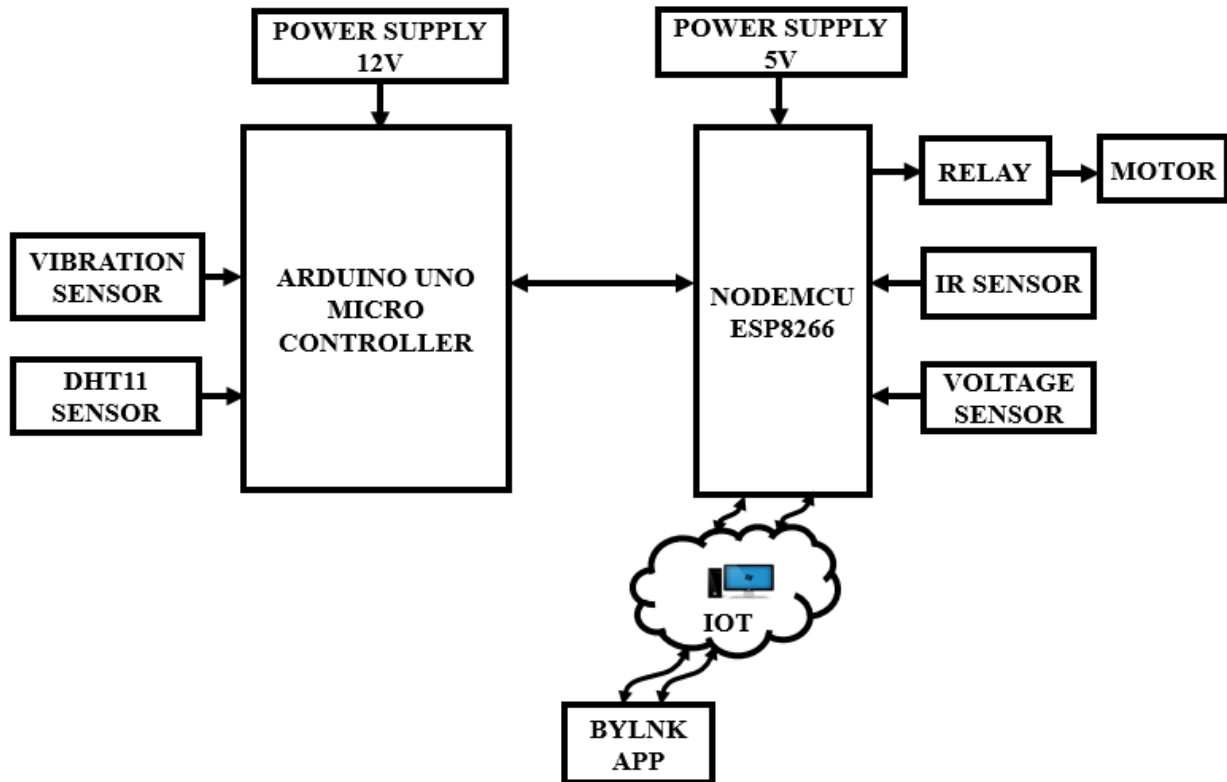
Fig 1 Block diagram

BLOCK DIAGRAM DESCRIPTION:

We use a 12 v SMPS module as the power supply for the industrial AC source that powers the Arduino Uno microcontroller. Here, we've connected a few sensors, such as a vibration sensor and a humidity sensor, to analyse the vibrations caused by the motor and the temperature of the surrounding environment. The relay is connected to the node MCU wifi module using a motor that is attached in parallel. Data will be supplied to the relay and the contact will be broken if a problem, abnormal temperature, or vibration occurs in the motor.

COMPONENTS USED
ARDUINO UNO:

The Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

VIBRATION SENSOR:

The sensor accustomed detect accident is shock sensor. This is often one stage shock sensor, it detects any hard impact acted thereon. The output from sensor after impact are +5v and connected to INT (pin 12) of processor. These sensors are fixed on all sides of the car to detect impact occurred thereon. These outputs from sensors is send into gate to detect a minimum of one impact. It's integrated within the circuit system by connecting all the sensors to gate whose output is connected to the int pin of microcontroller. These sensors are connected in such the simplest way that they detect force impact occurring from any side of the car. This is often concerned to the protection of the system of the human driving the car in order that once accident is detected the paramedics can reach to the placement as soon as they'll.

IR SENSOR:

IR sensor kit using LM 358 IC 3.5.1 IR LED IR LED emits light, in the range of Infrared frequency. IR light is invisible to us as its wavelength (700nm – 1mm) is much higher than the visible light range. Everything which produce

heat, emits infrared like for example our human body. Infrared have the same properties as visible light, like it can be focused, reflected and polarised like visible light.

VOLTAGE SENSOR:

A voltage sensor is a sensor used to calculate and monitor the amount of voltage in an object. Voltage sensors can determine the AC voltage or DC voltage level. The input of this sensor is the voltage, whereas the output is the switches, analog voltage signal, a current signal, or an audible signal.

RELAY:

A relay is an electromagnetic switch which is used to switch High Voltage/Current using Low power circuits. Relay isolates low power circuits from high power circuits. Voltage source: 230 V. Current: 10 A. Relay acts like a Switch.Latching relays require simplest a single pulse with a manipulate strength to perform the switch consistently. Some other pulse implemented to a 2nd set of manage terminals, or a pulse with contrary polarization, rearranges the transfer, whilst recursive pulses of the same kind need no consequences. Magnetic relays are useful in packages when breaking of sequence electricity must no longer change the circuits that the relay is regulating.

TEMPERATURE SENSOR:

The ultra-small size, low hardware overhead, powerful anti-interference capability, and high accuracy of the DS18B20 Waterproof Temperature Sensor Module, among other features, have increased its appeal among customers. For electronic enthusiasts and hobbyists who wish to learn about and build temperature-dependent prototypes, the DS18B20 is an excellent place to start.

DC MOTOR:

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

TEMPERATURE AND HUMIDITY SENSOR:

The DHT11 is digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air and outputs a digital signal on the data pin (no analog input pins needed). It's very simple to use, and libraries and sample codes are available for Arduino and Raspberry Pi.

SMPS:

This power source for the isolation industrial-grade built-in **power supply module**, temperature protection, and short circuit protection, AC85 ~ 265 v input voltage, wide 431 precision voltage stability DC5V output, with mounting holes, with input and output EMI filter circuit, small volume, stable performance, cost-effective.

NODE MCU WIFI MODULE:

The ESP-12 Lua Nodemcu WIFI Dev Board Internet Of Things with ESP8266 is an all-in-one microcontroller + WiFi platform that is very easy to use to create projects with WiFi and IoT (Internet of Things) applications. The board is based on the highly popular ESP8266 WiFi Module chip with the ESP-12 SMD footprint. This WiFi development board already embeds in its board all the necessary components for the ESP8266 (ESP-12E) to program and uploaded code. It has a built-in USB to serial chip upload codes, 3.3V regulator, and logic level converter circuit so you can immediately upload codes and connect your circuits. This board contains the ESP-12E chip with a 4MB! a flash memory so no worries for your long project codes!.This microcontroller board can easily be programmed using the Arduino IDE programming software.

BUZZER:

This is a small buzzer module that operates around the audible 2 kHz frequency range. It is an active buzzer, which means that it produces sound by itself, without needing an external frequency generator.It can easily be used with microcontroller boards, like Arduino, without needing a dedicated PWM channel.
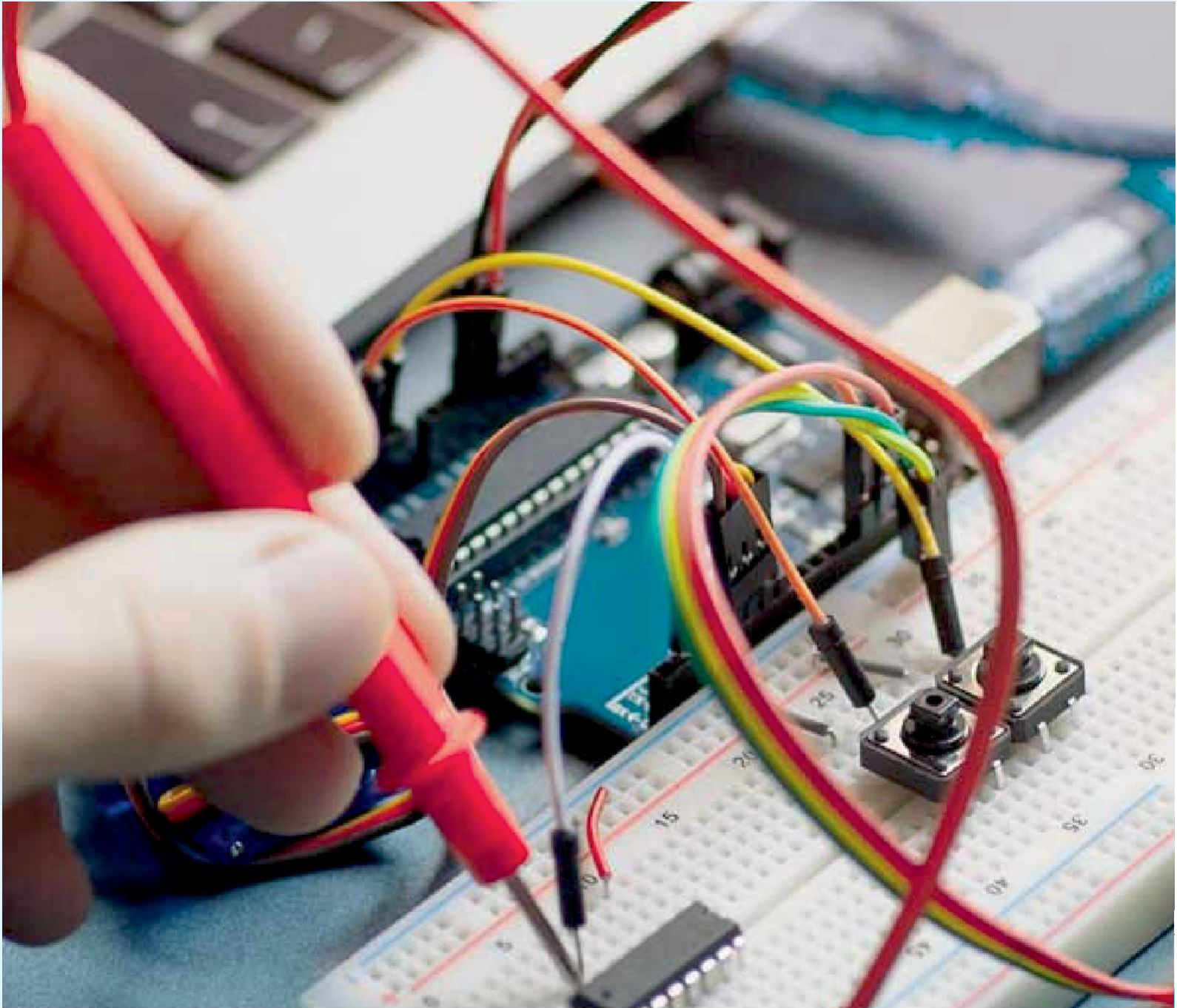
III. CONCLUSION

In this project, the motor faults are detected Using Arduino Uno and also message is displayed on LCD.There is one Arduino Uno used to detect the fault like over vibration, high voltage, low voltage, also controller is used to switch the Blynk App.The system is very cheap as compared to present protective devices available. The protection system can protect three phase induction motor from under voltage, over voltage, overloading and single phasing. By using sensing circuits we can sense voltage and current and these values given to controller. Controller will give the command to relay to ON-OFF the motor.

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